

WHAT IS CLAIMED IS:

1 1. A stamping tool comprising:
2 a stamp capable of imprinting at least one deposit of
3 deformable material on an integrated circuit substrate;
4 wherein said stamping tool is capable of aligning a
5 position of said stamp with respect to at least one tooling
6 hole in said integrated circuit substrate.

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10 2. The stamping tool as set forth in Claim 1 wherein
11 said stamping tool is capable of aligning a position of
12 said stamp with respect to at least one tooling hole in
13 said integrated circuit substrate to within a tolerance of
14 less than one hundred microns.
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1 3. The stamping tool as set forth in Claim 1
2 comprising:

3 a first stamping tool column having a lower end
4 capable of fitting within a first tooling hole in said
5 integrated circuit substrate;

6 a second stamping tool column having a lower end
7 capable of fitting within a second tooling hole in said
8 integrated circuit substrate;

9 a stamping tool cross member attached to an upper end
10 of said first stamping tool column and attached to an upper
11 end of said second stamping tool column;

12 a first stamp slide member attached to a first side of
13 said stamp, said first stamp slide member having portions
14 that form an aperture for slidably receiving said first
15 stamping tool column; and

16 a second stamp slide member attached to a second side
17 of said stamp, said second stamp slide member having
18 portions that form an aperture for slidably receiving said
19 second stamping tool column;

20 wherein said stamp may be slidably disposed on said
21 first stamping tool column and on said second stamping tool
22 column.

1 4. The stamping tool as set forth in Claim 3 wherein
2 said stamping tool is capable of aligning a position of
3 said stamp with respect to a location of said first tooling
4 hole in said integrated circuit substrate to within a
5 tolerance of less than one hundred microns; and

6 wherein said stamping tool is capable of aligning a
7 position of said stamp with respect to a location of said
8 second tooling hole in said integrated circuit substrate to
9 within a tolerance of less than one hundred microns.

10 5. The stamping tool as set forth in Claim 3

11 wherein said lower end of said first stamping tool
12 column is capable of fitting within said first tooling hole
13 in said integrated circuit substrate to within a tolerance
14 of less than one hundred microns; and

15 wherein said lower end of said second stamping tool
16 column is capable of fitting within said second tooling
17 hole in said integrated circuit substrate to within a
18 tolerance of less than one hundred microns.

1 6. The stamping tool as set forth in Claim 5
2 wherein said first stamping tool column is capable of
3 slidably fitting within said first slide member attached to
4 said stamp to within a tolerance of less than one hundred
5 microns; and

6 wherein said second stamping tool column is capable of
7 slidably fitting within said second slide member attached
8 to said stamp to within a tolerance of less than one
9 hundred microns.

10 7. The stamping tool as set forth in Claim 3 further
11 comprising a heating element associated with said stamp.
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1 8. The stamping tool as set forth in Claim 1
2 comprising:

3 a stamping tool base comprising a first tooling hole
4 alignment button capable of fitting within a first tooling
5 hole in said integrated circuit substrate and a second
6 tooling hole alignment button capable of fitting within a
7 second tooling hole in said integrated circuit substrate;

8 a first stamping tool column having a lower end
9 attached to said stamping tool base;

10 a second stamping tool column having a lower end
11 attached to said stamping tool base;

12 a stamping tool cross member attached to an upper end
13 of said first stamping tool column and attached to an upper
14 end of said second stamping tool column;

15 a first stamp slide member attached to a first side of
16 said stamp, said first stamp slide member having portions
17 that form an aperture for slidably receiving said first
18 stamping tool column; and

19 a second stamp slide member attached to a second side
20 of said stamp, said second stamp slide member having
21 portions that form an aperture for slidably receiving said
22 second stamping tool column;

23 wherein said stamp may be slidably disposed on said
24 first stamping tool column and on said second stamping tool
25 column.

1 9. The stamping tool as set forth in Claim 8 wherein
2 said stamping tool is capable of aligning a position of
3 said stamp with respect to a location of said first tooling
4 hole in said integrated circuit substrate to within a
5 tolerance of less than one hundred microns; and

6 wherein said stamping tool is capable of aligning a
7 position of said stamp with respect to a location of said
8 second tooling hole in said integrated circuit substrate to
9 within a tolerance of less than one hundred microns.

10 10. The stamping tool as set forth in Claim 8

11 wherein said first tooling hole alignment button is
12 capable of fitting within said first tooling hole in said
13 integrated circuit substrate to within a tolerance of less
14 than one hundred microns; and

15 wherein said second tooling hole alignment button is
16 capable of fitting within said second tooling hole in said
17 integrated circuit substrate to within a tolerance of less
18 than one hundred microns.

1 11. The stamping tool as set forth in Claim 10
2 wherein said first stamping tool column is capable of
3 slidably fitting within said first slide member attached to
4 said stamp to within a tolerance of less than one hundred
5 microns; and

6 wherein said second stamping tool column is capable of
7 slidably fitting within said second slide member attached
8 to said stamp to within a tolerance of less than one
9 hundred microns.

10 12. The stamping tool as set forth in Claim 8 further
11 comprising a heating element associated with said stamp.

1 13. A method for aligning an integrated circuit die
2 on an integrated circuit substrate, the method comprising
3 the steps of:

4 placing a plurality of deposits of deformable material
5 on said integrated circuit substrate where said integrated
6 circuit die is to be attached to said integrated circuit
7 substrate;

8 placing a stamping tool into at least one tooling hole
9 within said integrated circuit substrate;

10 imprinting said plurality of deposits of deformable
11 material with said stamping tool; and

12 placing said integrated circuit die into a pocket
13 formed in said plurality of deposits of deformable
14 material.

1 14. The method as set forth in Claim 13 wherein said
2 stamping tool is capable of imprinting said plurality of
3 deposits of deformable material to within a tolerance of
4 less than one hundred microns with respect to at least one
5 tooling hole in said integrated circuit substrate.

1 15. The method as set forth in Claim 13 wherein said
2 plurality of deposits of deformable material is composed of
3 one of: a metal, a solder material and a polymer material.

1 16. The method as set forth in Claim 14 further
2 comprising the step of heating said deposits of deformable
3 material.

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1 17. A method for aligning an integrated circuit die
2 on an integrated circuit substrate of the type comprising a
3 first tooling hole and a second tooling hole, the method
4 comprising the steps of:

5 placing a plurality of deposits of deformable material
6 on said integrated circuit substrate where said integrated
7 circuit die is to be attached to said integrated circuit
8 substrate;

9 placing said integrated circuit substrate on a
10 stamping tool base of a stamping tool;

11 imprinting said plurality of deposits of deformable
12 material with a stamp of said stamping tool;

13 removing said integrated circuit substrate from said
14 stamping tool base of said stamping tool; and

15 placing said integrated circuit die into a pocket
16 formed in said plurality of deposits of deformable material
17 created by imprinting said plurality of deposits of
18 deformable material with said stamp of said stamping tool.

1 18. The method as set forth in Claim 17 wherein said
2 step of placing said integrated circuit substrate on a
3 stamping tool base of a stamping tool comprises the steps
4 of:

5 placing a first tooling hole alignment button of said
6 stamping tool base within said first tooling hole of said
7 integrated circuit substrate to within a tolerance of less
8 than one hundred microns; and

9 placing a second tooling hole alignment button of said
10 stamping tool base within said second tooling hole of said
11 integrated circuit substrate to within a tolerance of less
12 than one hundred microns.

1 19. The method as set forth in Claim 17 wherein said
2 step of imprinting said plurality of deposits of deformable
3 material with a stamp of said stamping tool comprises the
4 steps of:

5 aligning a position of said stamp with respect to a
6 location of said first tooling hole in said integrated
7 circuit substrate to within a tolerance of less than one
8 hundred microns;

9 aligning a position of said stamp with respect to a
10 location of said second tooling hole in said integrated
11 circuit substrate to within a tolerance of less than one
12 hundred microns; and

13 imprinting said plurality of deposits of deformable
14 material with said stamp.

15 20. The method as set forth in Claim 17 wherein said
16 plurality of deposits of deformable material is composed of
17 one of: a metal, a solder material and a polymer material.

1 21. The method as set forth in Claim 17 further
2 comprising the step of heating said deposits of deformable
3 material.

1 22. The method as set forth in Claim 17 further
2 comprising the step of creating at least one geometrical
3 alignment guide feature in at least one deposit of
4 deformable material on said integrated circuit substrate.

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